

AR42

GREATER WINNIPEG

PIONEER
ELECTRIC

INDUSTRIAL TOPICS

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JULY, 1968

T. S. DURHAM, Commissioner

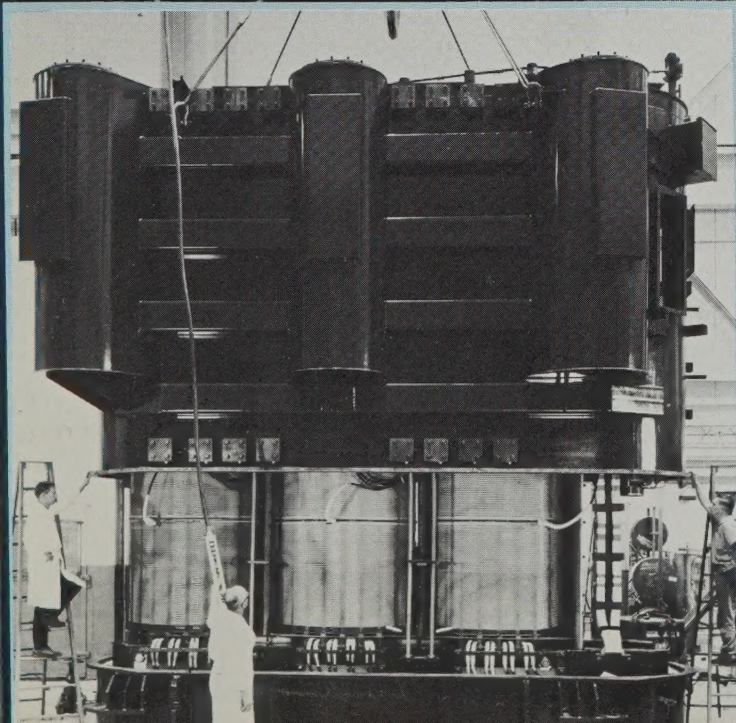
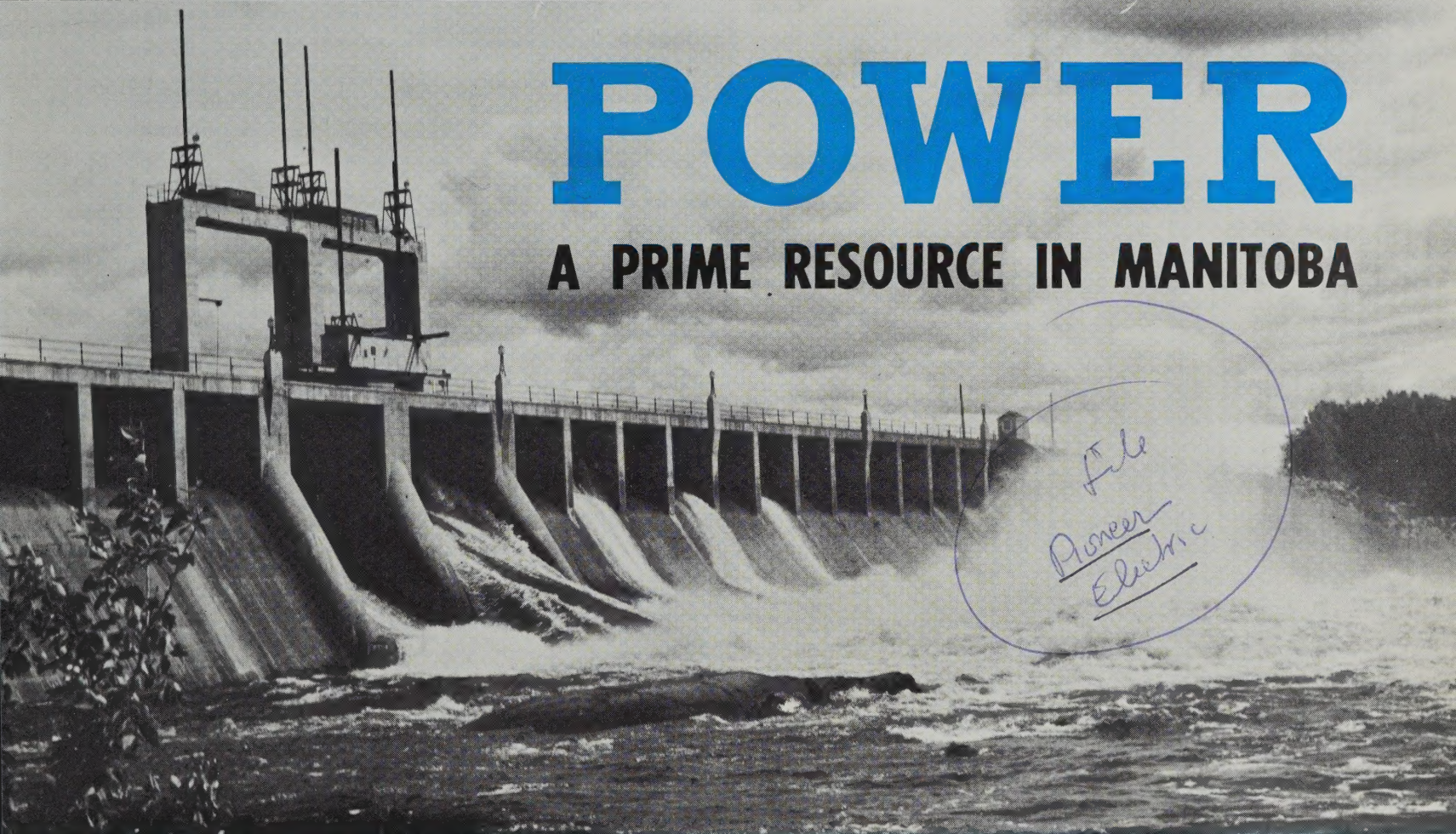
G. E. PARIS, Editor

B. H. LACEY, Chairman

Vol. 28, No. 5

POWER

A PRIME RESOURCE IN MANITOBA



TRANSFORMED

to

MEET OUR NEEDS

by

EQUIPMENT MADE HERE

presented by

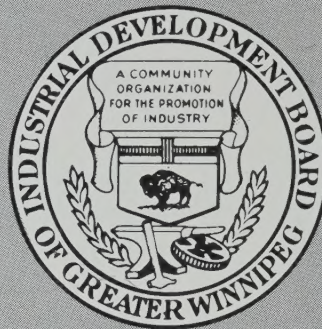
THE INDUSTRIAL DEVELOPMENT BOARD OF GREATER WINNIPEG

Serving the Community for Over 40 Years

FRONT COVER:

Spilling water at Seven Sisters.

Top portion of tank being lowered over core
and coil assembly of Pioneer Electric
transformer.



- ★ *The Industrial Development Board of Greater Winnipeg is a non-profit, service organization, acting on behalf of the citizens of Greater Winnipeg. Its main function is to promote the establishment of worthwhile industrial and commercial enterprises and at the same time publicize the fact that this is an excellent community in which to work and live.*
- ★ *Information and assistance is available free of charge to bona fide enquirers and their identity is considered confidential.*
- ★ *The Board has a Site Selection Department and maintains records of sites and building space available in the metro area.*
- ★ *Write, phone, or visit the Board's office—
203 - 259 Portage Avenue,
Winnipeg 2, Manitoba, Canada.
Area Code 204 - 942-6751 or 943-5997*
- ★ *T. S. Durham, Industrial Commissioner.*

IT IS APPROPRIATE that this special issue of Industrial Topics should deal mainly with the activities of Manitoba Hydro, and Pioneer Electric, since the relationship between the two dates from the latter's inception just over 20 years ago. Both organizations have outstanding growth records and each has made a significant contribution to the economy of this area.

Pioneer Electric's impressive progress is revealed by a comparison of the dollar value of goods produced in the first year of operation—\$147,000, and in the year just passed—\$9,000,000. Manitoba Hydro (Manitoba Power Commission) reported an income of slightly less than \$3,000,000 in 1948. Ten years later its income was \$18,400,000, and its Annual Report for 1967 showed a net income of \$46,500,000.

It is not possible in the space available to tell the full story of power development and distribution in Manitoba, nor to recount all the details of Pioneer Electric's achievements. However, we do hope to achieve two things by publishing this particular issue of Industrial Topics. One of our stories gives assurance to potential as well as established industries, that their power needs will always be satisfied. The other story shows how well industry can succeed in Greater Winnipeg and Manitoba, even to the extent of competing with the giants in its field. Hopefully we look for another beneficial result, and that is a greater awareness on the part of Winnipeggers and Manitobans regarding the possibilities and the potential of our city and province.

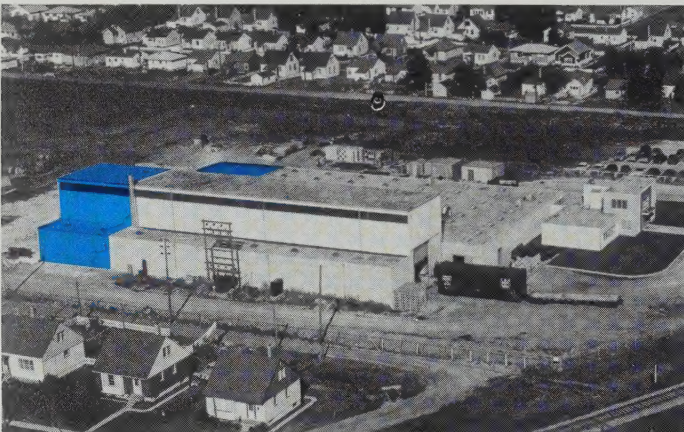
PIONEER ELECTRIC—The Firm That Did "What Couldn't Be Done"

YES, THE EXPERTS back in 1946 said "you can't build transformers in Manitoba" but the message just didn't get through to three enterprising young Canadians who combined the necessary technical knowledge with a good deal of persistence and proved the experts wrong. The result is a major industrial operation of which Manitobans can be justifiably proud. The following pages are a brief attempt to set down the early history of this comparatively young firm, and to illustrate its accomplishments to date and something of its plans for the immediate future.

THE BEGINNING

Our magazine, *Industrial Topics*, proves more and more to be a valuable historical record of industrial development in this area. This is the case with Pioneer Electric, for the opening chapter of this firm's impressive success story is revealed in the January-February, 1947, issue. A heading on the story reads—"Official Opening of the Pioneer Electric Plant in St. Boniface Attracts Considerable Interest Among Provincial Experts". Among those "interested parties" were Messrs. W. D. Fallis and T. E. Storey, now

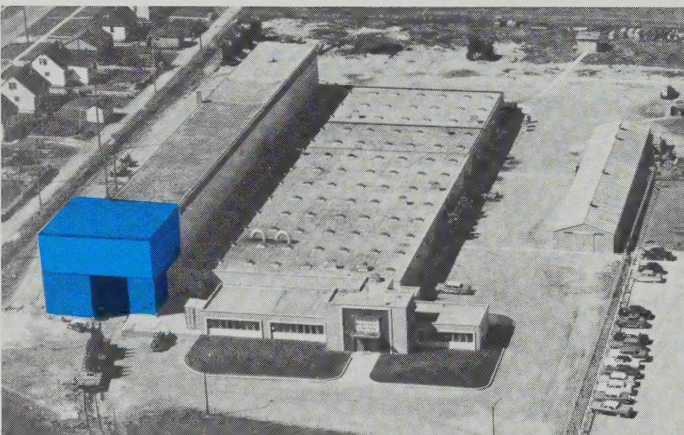
1955



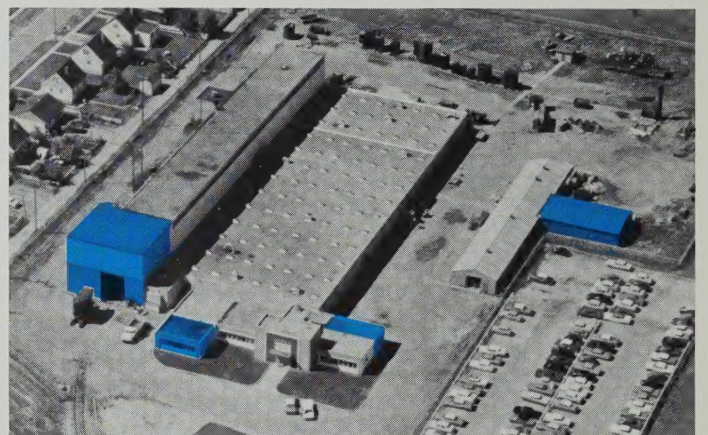
1957



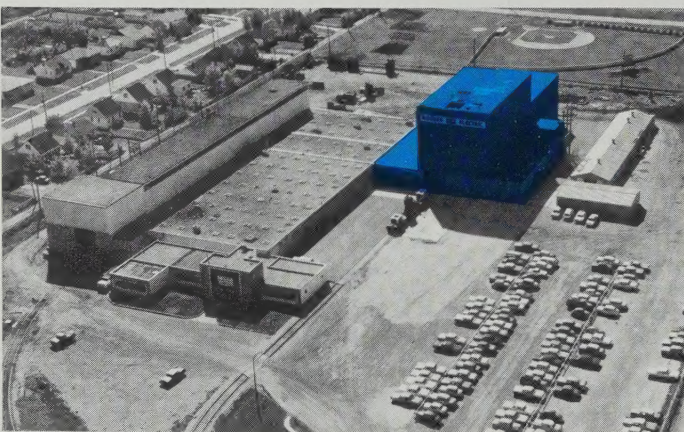
1958



1962



1964



1965



Shaded portions show construction activity at Pioneer Electric's plant in Fort Garry, Manitoba since it was established there in 1954.



D. L. Campbell, then Premier of Manitoba, declares the Fort Garry plant of Pioneer Electric officially open by setting in the date-inscribed Tyndall stone. With him is R. Noonan, President and General Manager of the company.

Chairman and Assistant General Manager respectively, of Manitoba Hydro.

The article in *Industrial Topics* saluted Pioneer Electric as the only plant of its kind in Western Canada. The originators of the enterprise were R. Noonan, President and General Manager, A. M. Tallman, Chief Engineer, and D. E. Mathewson, Plant Manager. The young management team had impressive credentials which were duly recorded in the aforementioned write-up. Mr. Noonan, a graduate in Electrical Engineering from the University of Manitoba, did post-graduate work at the University of Manchester, England, and spent four years with Ferranti Ltd. in that city progressing to the position of Assistant Works Manager of that firm's transformer department. He then worked four years for a Canadian transformer manufacturer. Mr. Tallman acquired a Degree in Electrical Engineering from the University of Alberta and worked for a period with a large transformer manufacturer in Canada. Mr. Mathewson had wide experience in the manufacture of all types of transformers from the smallest up to 22,000 K.V.A. capacity weighing 85 tons. He was with the English Electric Co. of Canada Ltd. for more than ten years and became foreman of the company's transformer department.

At the time of the official opening of the original Pioneer Electric plant, Mr. Noonan stated that "the Industrial Development Board had been instrumental in bringing the industry to Manitoba". He also gave due credit to the Manitoba Power Commission "for its far-sighted policy of buying products from local industries wherever possible", as evidenced by the orders placed by the Power Commission for Pioneer transformers. As a result, the new company from the beginning became associated with the major program of rural electrification in Manitoba.

SUBSEQUENT DEVELOPMENTS

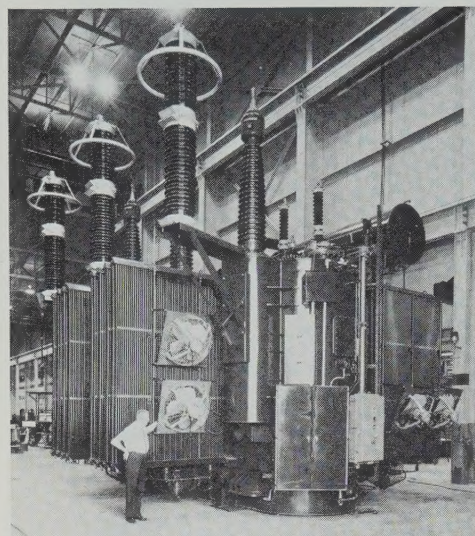
The following chronological outline, coupled with the accompanying photographs, give a good indication of the major steps in the progression of this company from a manufacturer of small "farmyard" transformers, to a place in the forefront of Canada's transformer manufacturing industry.



Two of the originators of Pioneer Electric testing some of the first transformers in the St. Boniface plant. R. Noonan on the right with D. E. Mathewson, now Vice-President in charge of Manufacturing and Personnel.

- 1952—Opened a branch plant in Red Deer, Alberta.
- 1954—Moved into a new plant at the present location in Fort Garry.
 - Established a plant at Regina, Saskatchewan.
 - Purchased the assets of C. T. Controls in Brandon and reconstituted the company as Pioneer Electric Brandon Limited, for the manufacture of electric heating products and control equipment.
 - Began design and manufacture of metalclad switchgear and completed development of new "on-load" tap gear with unique moulded epoxy components.
- 1956—Purchased the plant and assets of Supreme Power Supplies Limited, in Toronto, which when re-organized as Pioneer Electric Ontario Limited, made possible expansion into Eastern Canadian markets.
- 1960—Pioneer Electric group purchased by Federal Pacific Electric of Newark, New Jersey, U.S.A. (F.P.E.) and began operations as an independent subsidiary of F.P.E.
 - Set up a plant at Granby, Quebec, to produce distribution transformers.
- 1965—Formed a public Canadian company to hold the assets of both Pioneer Electric Limited and Federal Pacific Electric of Canada Limited, under the name FPE-Pioneer Electric Limited, with two operating divisions:
 - Pioneer Electric Division—operating six Pioneer plants with Mr. R. Noonan as General Manager and head office located in Winnipeg.
 - Federal Pacific Electric Division—with plants in Vancouver, Toronto and Granby—Mr. B. W. Ball, Ball, General Manager.
 - Completed new 50,000 square foot plant in Toronto.
- 1965—Completed addition to Winnipeg plant brings the total floor area to over 100,000 square feet.
- 1967—New plant opened at Granby, Quebec.
- 1968—Twenty-one years since the Company was founded. Now there are six plants across Canada with total floor space of 250,000 square feet. There are sales offices in Canada's largest cities, and affiliated companies in the U.S.A., Germany, South Africa, Italy, Austria, Australia, and the United Kingdom. The work force now totals more than 850. Manufacturing activities now include production of EHV and EHV-DC transformers up to 250 MVA. 500 KV class.
 - Plans announced for expenditures of \$1,000,000 within 12 months for a 13,000 square foot addition to the high bay assembly area, a 4,000 square foot office section, and new equipment costing about \$600,000.

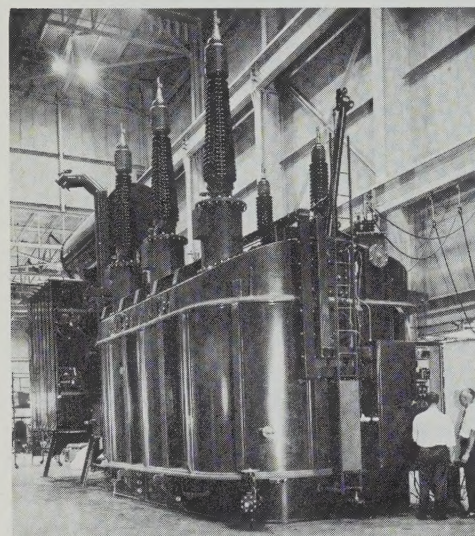
Products



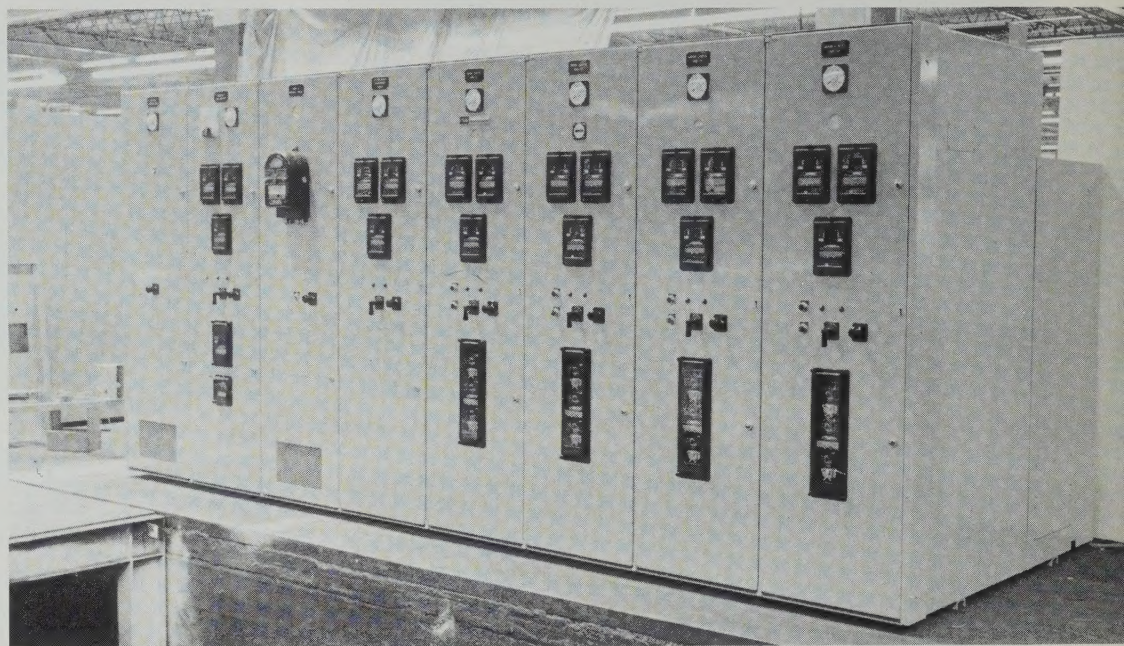
A 75/100/125 MVA Power Transformer 226KV complete with OLTC.



A noteworthy shipment to Shawinigan Electric for use by Quebec Hydro.



A 90/120/150 MVA Transformer with voltage 236000Y-138000Y 12600 Delta, supplied to B.C. Hydro and Power Authority.



A 5KV indoor metalclad switchgear assembly ready for shipment.

PHOTOS - ROBINSON PHOTOGRAPHY
DAVID PORTIGAL & CO.
CAMPBELL & CHIPMAN

FROM THE ORIGINAL production of small rural transformers weighing 200 pounds, Pioneer Electric has expanded its productive capacity so that it is now manufacturing Extra High Output and Extra High Voltage DC power transformers up to 250,000 KVA, 500,000 Volts, weighing 250 tons. Pioneer's products include transformers, regulators, load tap changers, reactors, potential and current transformers, metalclad and metal enclosed switchgear of 5,000 and 15,000 Volt class, unit power centres, air circuit breakers, and electric heating and related products, shipped to utilities and industrial accounts throughout the world.

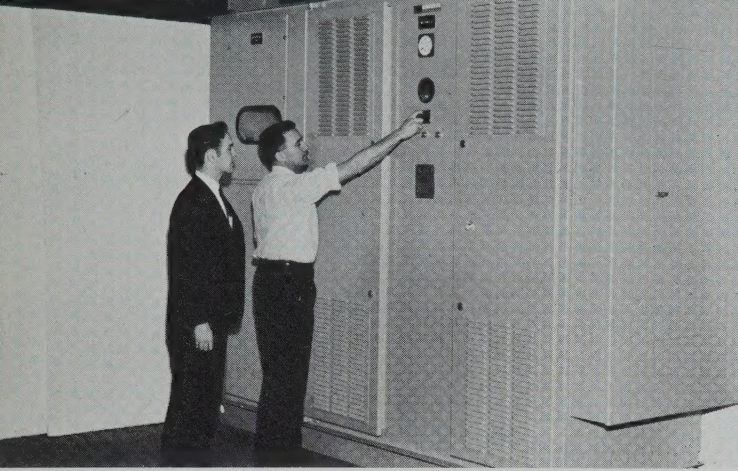
Pioneer Electric's present and future plans are for continuation of the present rapid growth rate. The largest single expansion is the Company's entry into the EHV-DC transformer market brought about by an order from Manitoba Hydro for nine EHV-DC transformers for the Nelson River project. This order is valued at over \$2 Million. Another recent order

also obtained in the face of stiff international competition, is for nine, EHV 500 KV transformers for B.C. Hydro's Peace River project.

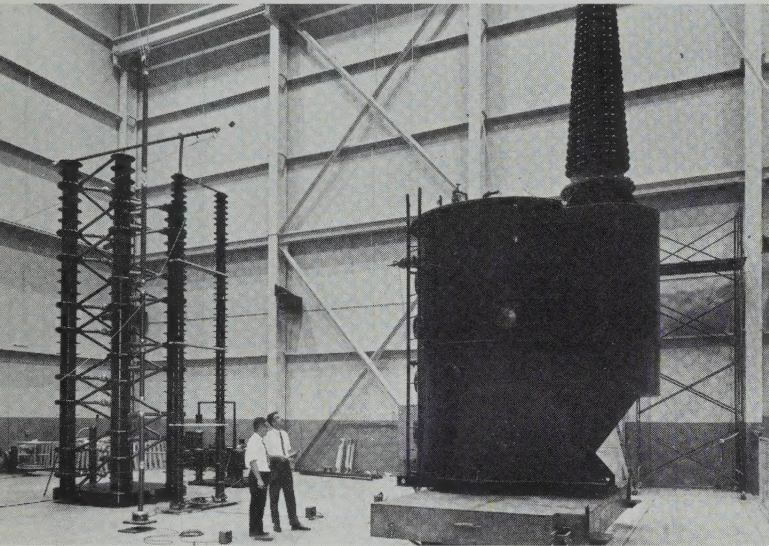
The Company's work force exceeds 850 of which approximately 400 are employed in the Greater Winnipeg plant in Fort Garry, Manitoba. Other statistics of particular consequence to the Greater Winnipeg area include a total annual payroll of over \$2 Million; property tax—\$50,000; business tax—\$8,400; utilities bill—\$52,000; material supplies purchased in Manitoba—\$2,300,000. The Canadian content of Pioneer transformers runs about 98%.

Shipments made by Pioneer Electric to Customers outside Canada include 9—10,000 KVA transformers to East Pakistan—\$360,000; 2—20/26.6/33.3 MVA transformers shipped to Louisiana Light and Power Company; and a contract to supply Duke Power Company in the U.S. with several small and medium power transformers—\$1,200,000.

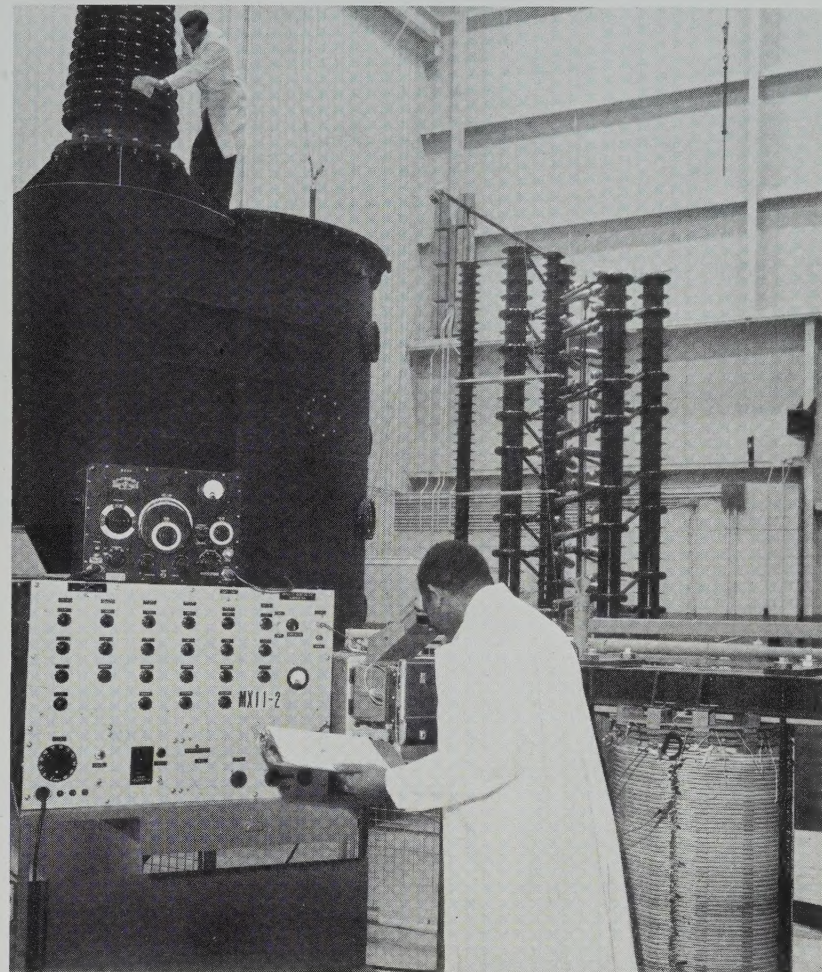
Research and Development



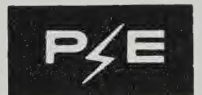
One of seven compact substations built by Pioneer Electric for Manitoba Hydro's Kettle Rapids project. Each unit contains a transformer (4160 volts to 600 volts) and distribution panel.



Impulse Generator and 500 KV Coil Tank in Winnipeg plant.



Corona and Surge Distribution Evaluation in the EHV Research Lab at Pioneer's Winnipeg plant.



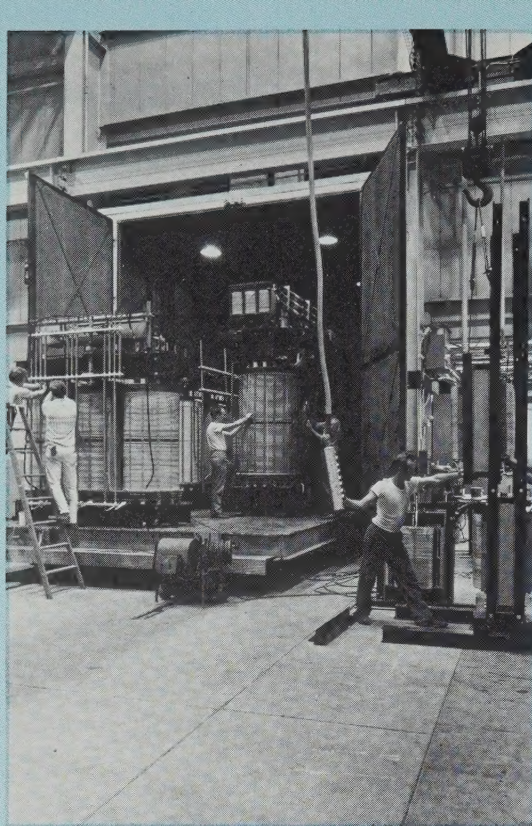
PIONEER ELECTRIC has always been concerned with keeping abreast of new techniques and developments in the design, manufacture, and testing of the various items which it manufactures. The Company's well established Research and Development Laboratory at its Greater Winnipeg plant is equipped with a 2,800,000 volt impulse generator, recurrent surge generator and oscillograph. A Bendix digital computer is also an important part of the department.

With the endorsement of the National Research Council, Pioneer Electric has initiated research into various phases of transformer manufacture, looking to EHV and EHO transformers of the future, as well as the improvement of present designs. The Company is regarded as a leader in certain aspects of switchgear design and manufacture. Pioneer scored an important "first" in North America by using cast epoxy components in the design of load tap changers. A number of encapsulated products such as current and potential transformers resulted from the firm's exhaustive research into uses of epoxy. The latest development involves the first use of vacuum interrupters in Canada.

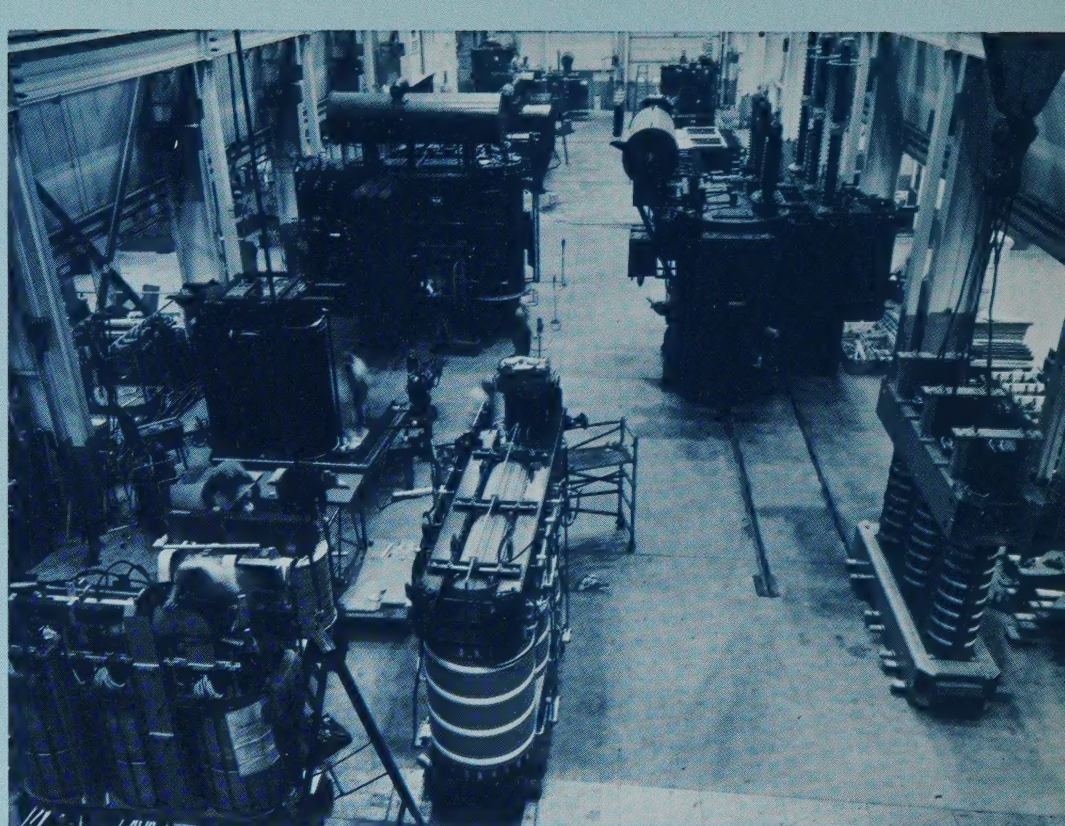
The purchase and installation of additional test equipment at the Greater Winnipeg plant constitutes a substantial part of Pioneer's million dollar expansion program now underway. The test equipment will

include an impulse generator to be rated at either 180 KWS 3.6 million volts, or 270 KWS, 3.6 million volts—cost between \$175,000 and \$230,000. Other items of test equipment ordered are a DC generator rated at 900 KV and 700 KV at 20 MA (components)—\$35,000; control centre for both generators—\$5,000; and an induced testing 300 cycle generator—\$75,000 est. New electrical services for the above test facilities will cost an estimated \$131,000.

Pioneer Electric's interest and participation in research is well known among manufacturers, scientists and technicians in the electrical equipment industry. In 1958 the Company donated a Bendix digital computer to the University of Manitoba for research and for training students in the fields of mathematics, science and engineering. More recently, in 1967, Pioneer was co-sponsor with Manitoba Hydro, The National Research Council and the University of Manitoba, of an EHV Symposium held at the University. Since it was the second gathering of its kind ever to be held, it must be acknowledged to be one of the outstanding happenings in this city and province during Canada's centennial year. Although it was anticipated that about 30 persons might attend the conference, the actual attendance totalled 140 with visitors from many parts of the world taking part.

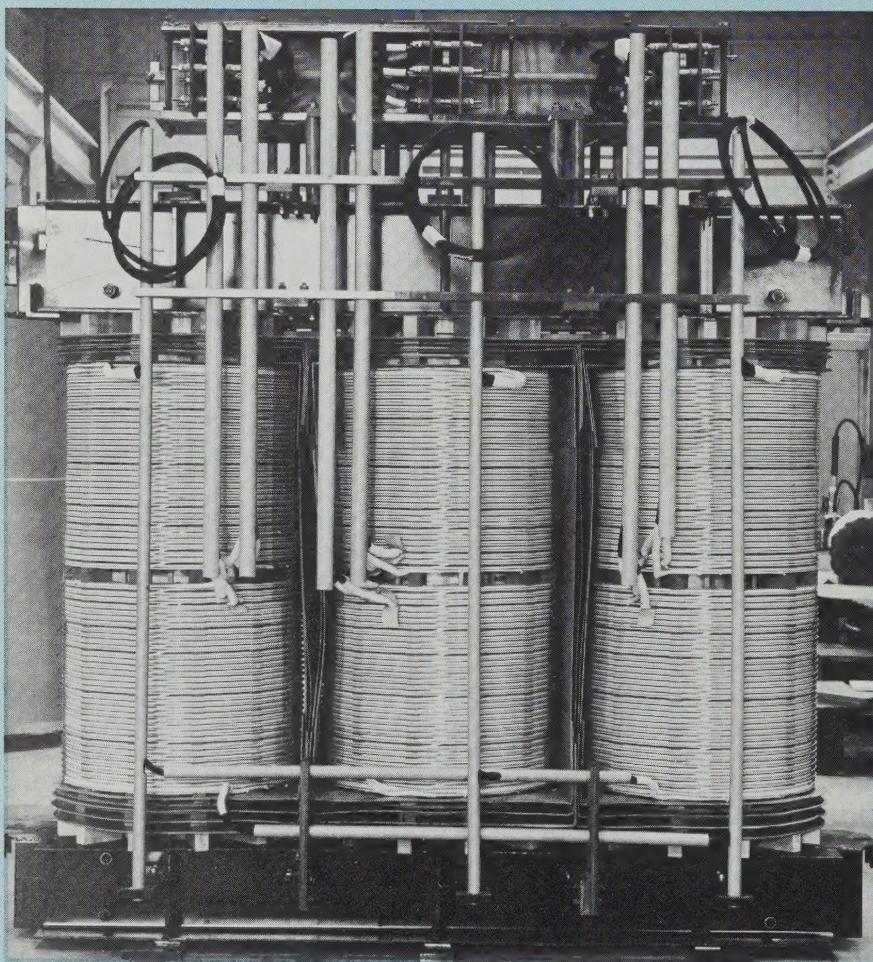


Coil and core drying oven.

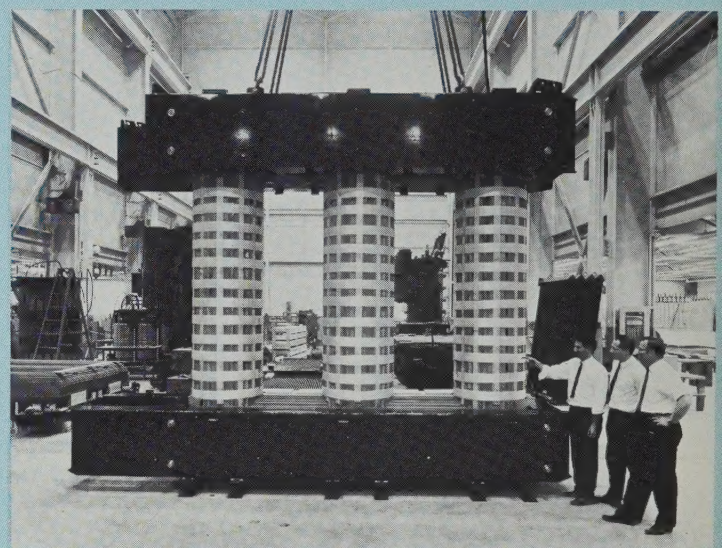


View of high bay transformer assembly area.

Transformer Manufacture at PIONEER ELECTRIC'S Greater Winnipeg Plant



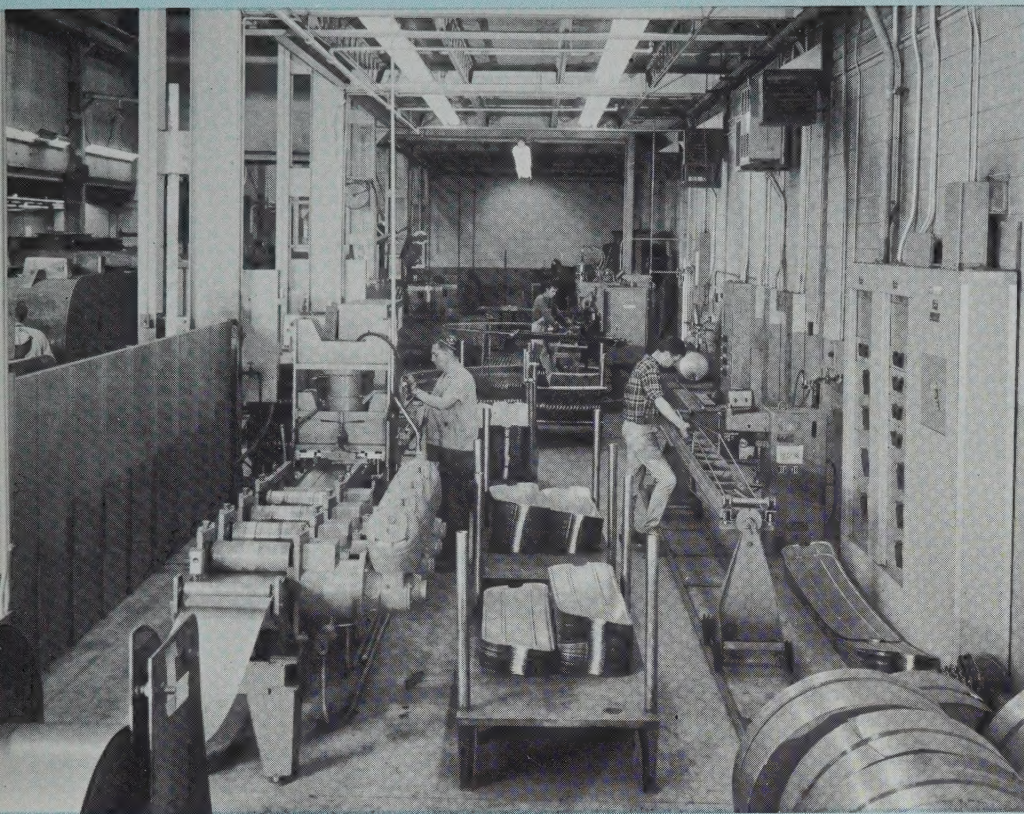
Core and coil assembly.



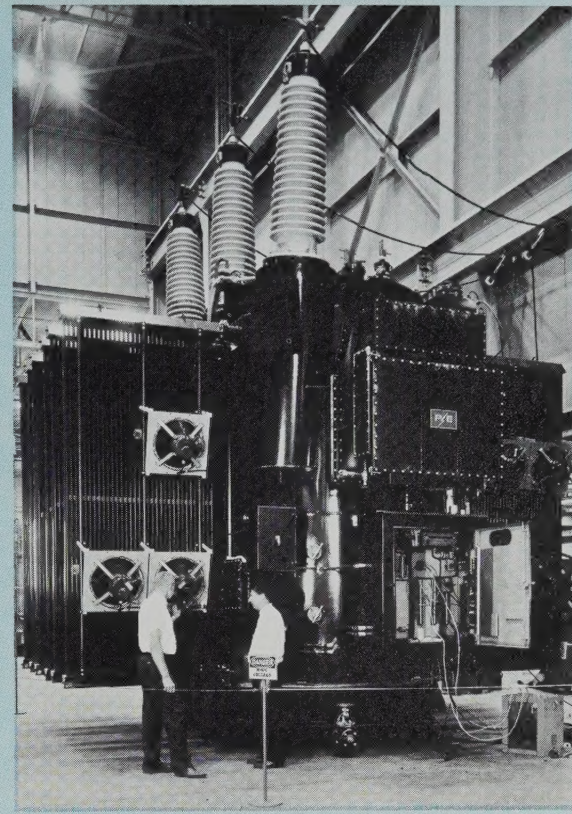
Power transformer clamped core assembly after tilting to vertical.



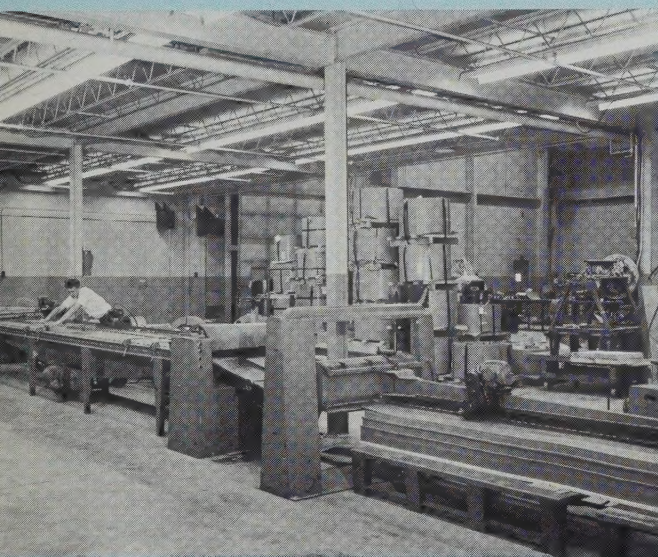
DST Magnetic Air Circuit Breaker manufacture.



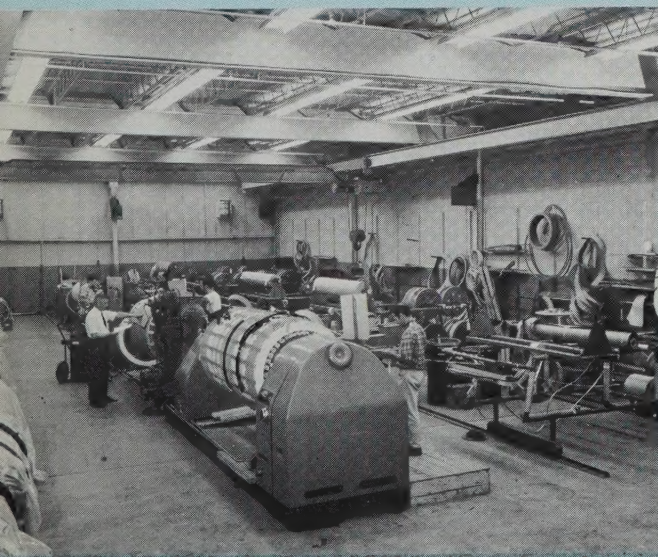
Manufacture of transformer radiators.



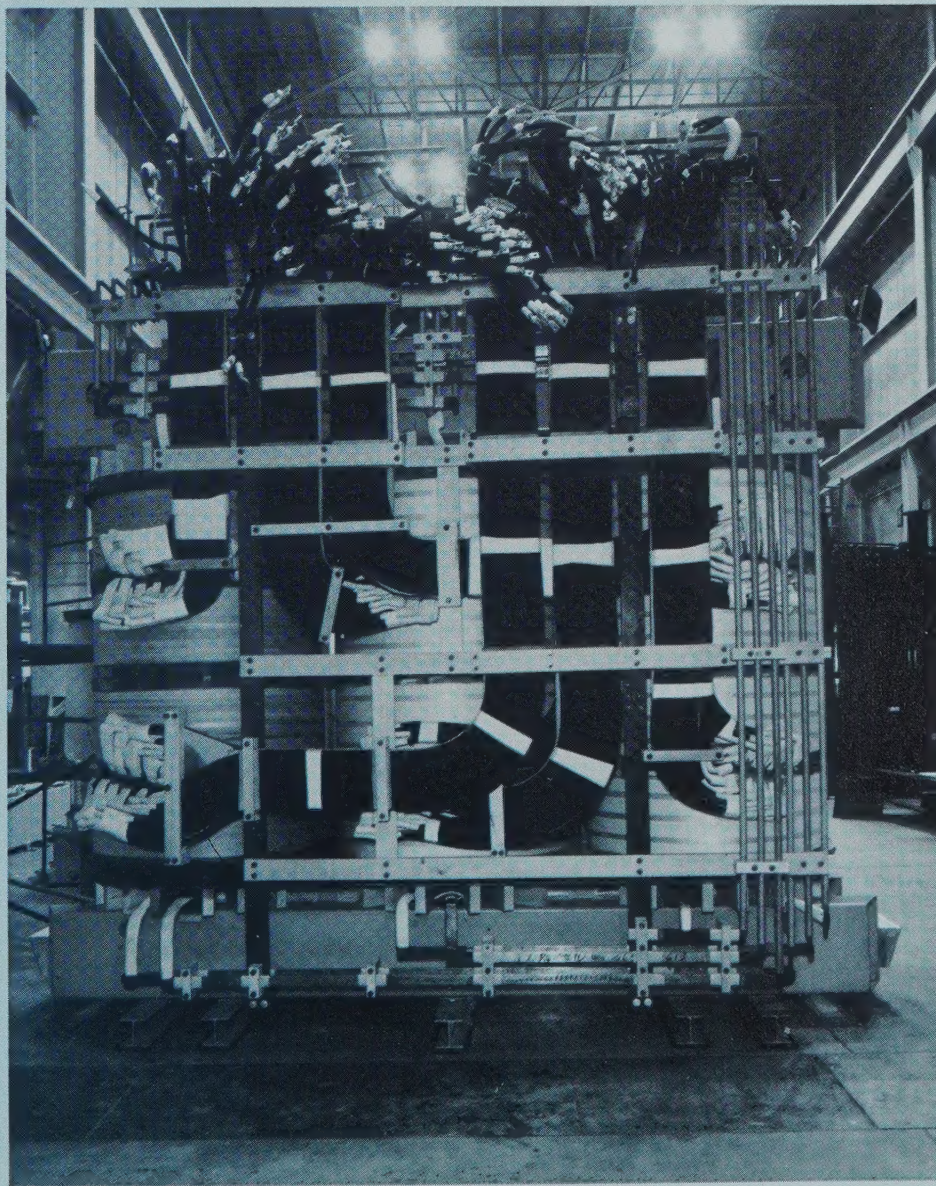
A 20/26.6/33.3 MVA Transformer. Voltage 22000 Delta/11000 Delta — 34500Y/19920. Sold to the Louisiana Power Light Co.



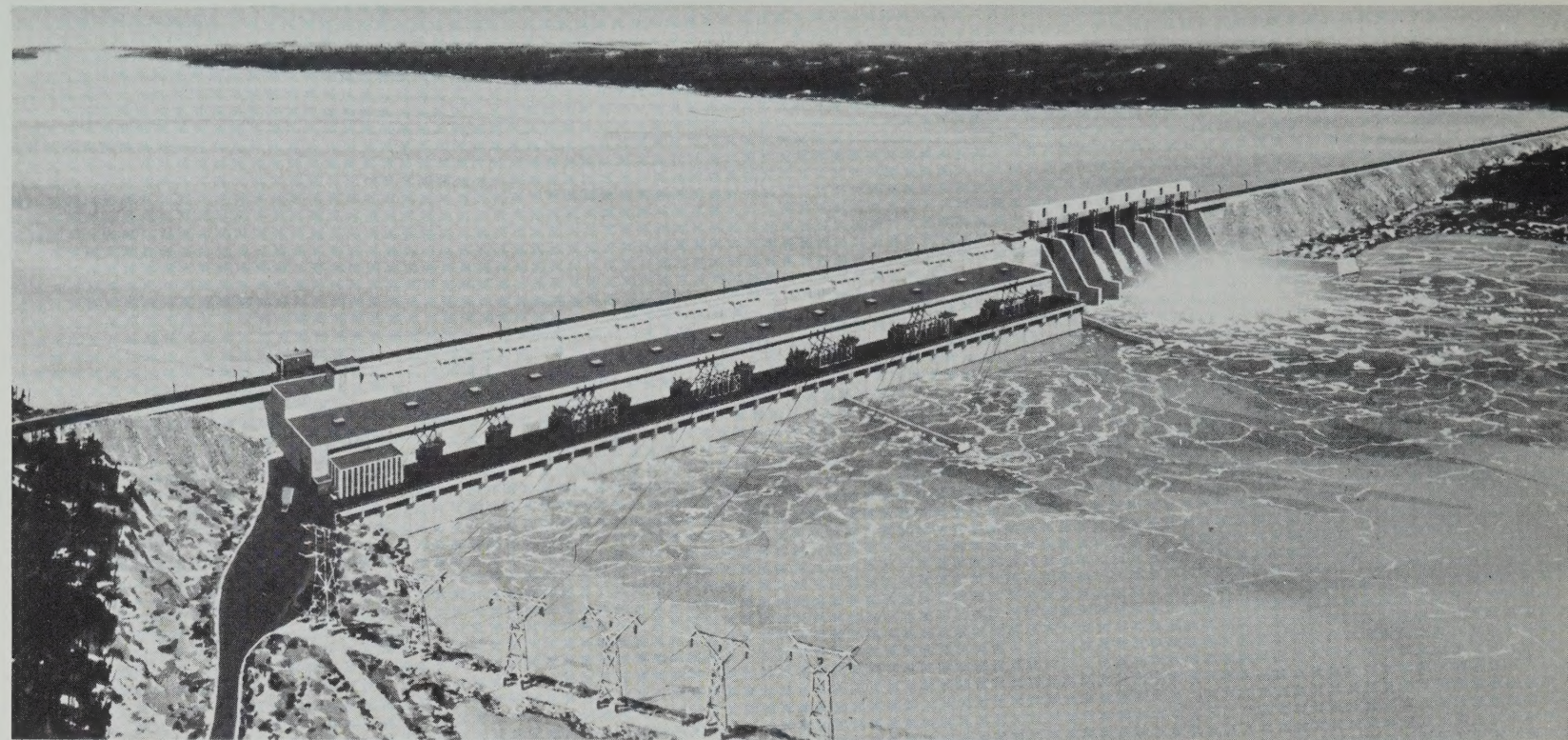
Cutting core materials for use in transformers at Pioneer Electric's meg plant.



Transformer coil winding.

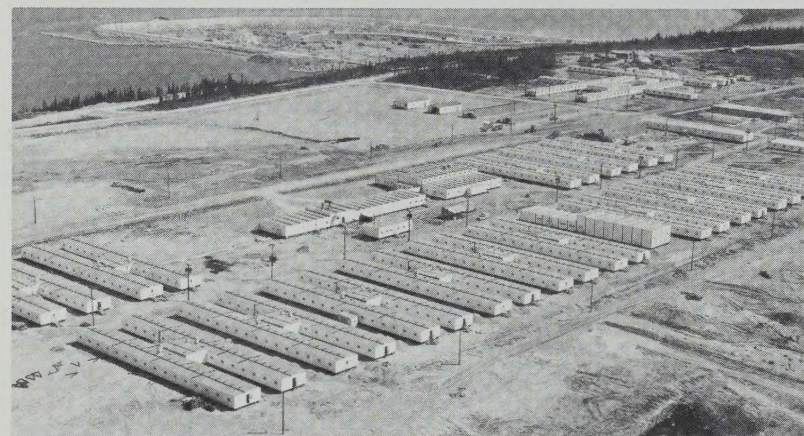


Extensive wiring in large transformer.

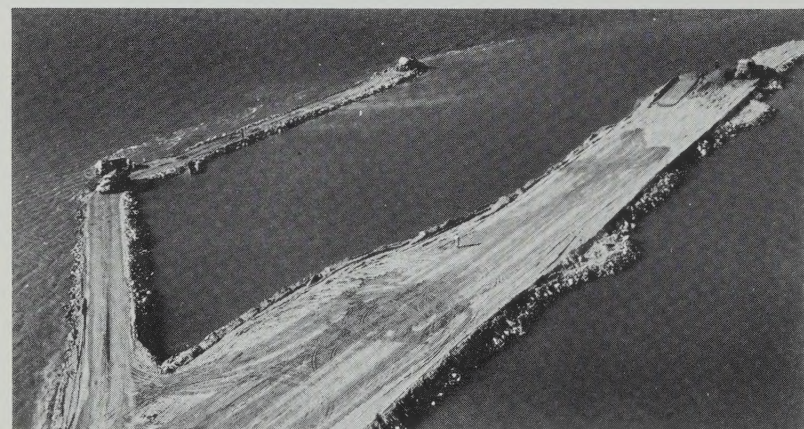


Artist's conception of the Kettle power station when completed.

Manitoba Hydro's KETTLER POWER DEVELOPMENT Project



Modular trailer camp accommodates 2,000 men at Kettle Rapids site. Cofferdam in background.



Cofferdam under construction. Breakwater (left), diverts main force of the river around the cofferdam.

ACCORDING TO THE construction schedule, the first 4 of a total of 12 generators should be producing power at the giant Kettle Generating station in Northern Manitoba in 1971. This ambitious project now employs close to 2,000 workers and will ultimately generate 1.2 million kilowatts of electricity, more than the combined production of the 6 Winnipeg River plants plus those at Grand Rapids and Kelsey. The combined cost of the Kettle power station and the transmission line will be approximately \$400 million. This comprises the first stage of the entire Nelson River power development which represents an estimated potential of 5,553,000 kilowatts.

The Kettle dam structure is more than a mile long and its highest level is the equivalent of a 10-storey building. A large portion of the structure was totally enclosed and heated so that work could proceed without interruption throughout the winter. By the time the job is completed, nearly a million cubic yards of concrete will have been poured and 35,000 tons of reinforcing steel will have been used.

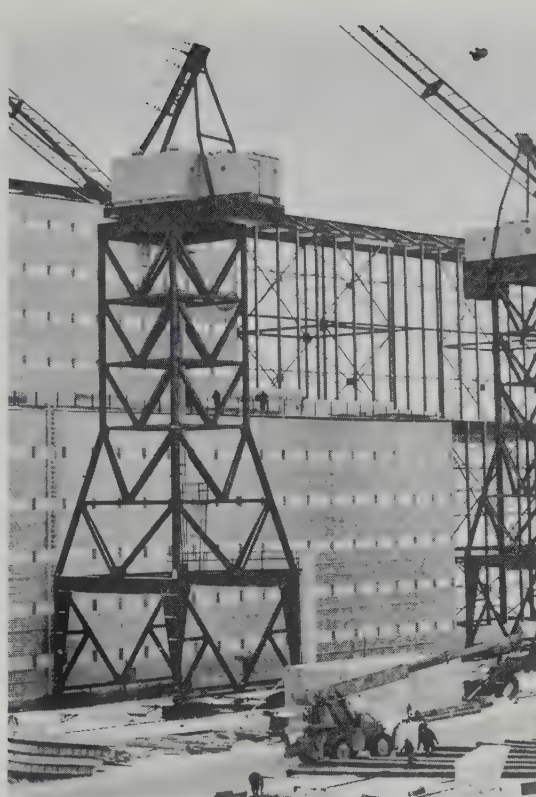
Kettle Generating Station is located on the Nelson River, less than 500 air miles northeast of Winnipeg. The nearest settlement is Gillam on the C.N.R.'s Hudson Bay Railway. The powerhouse and the spillway are being built in the main river channel where the head of water will be 98 feet. The powerhouse is designed for 12 units, each with a capacity of 102,000 kilowatts. The project requires 5 miles of dykes with a base up to 650 feet wide, height up to 105 feet, and width across the top of 20 feet. Excavated material will total 4,000,000 cubic yards of which 300,000 cubic yards is rock.

CONSTRUCTION PHASES

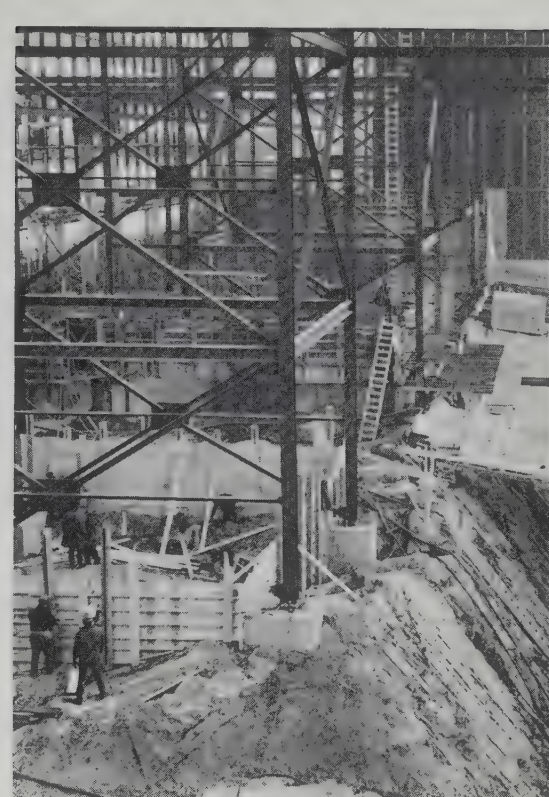
1. Construction of camp facilities and access roads.
2. Construction of a cofferdam inside which the first of the dam and powerhouse are located.
3. Breaching of cofferdam and diverting of river through newly constructed powerhouse.
4. Construction of a second cofferdam inside which the remaining portion of the dam will be built.



The new townsite at Gillam.



Sheathing enclosing the dam structure at Kettle. Workmen at ground level are dwarfed by the magnitude of the project.



Working on bedrock inside the closure these men are placing forming and reinforcing steel at 100 feet below the ultimate head water level.

5. Removal of cofferdams to permit river to flow either through the powerhouse or over the spillway. Also installation of remaining equipment.

GILLAM

Gillam, the service centre for the Kettle development, was formerly a sleepy hamlet nestling alongside the Hudson Bay Railway about halfway between the mining centre of Thompson and the seaport of Churchill. It is a few minutes by road from the dam site. Today it is a bustling, modern community with all the amenities required by a centre with a population of several thousand. Complete sewer and water systems have been installed. Other facilities include a 2-storey recreation centre, 42 homes for permanent Manitoba Hydro employees, a municipal building, a 15-bed hospital, and a 14-room school. Construction of a shopping centre is well advanced while a new hotel is scheduled for 1968.



Pouring concrete on the dam structure. Note vast amount of reinforcing steel.



Typical work scene inside the cofferdam.



Gillam, before the Kettle development.

Nelson River POWER POTENTIAL



THE NELSON RIVER is entirely within the Province of Manitoba and is one of the largest remaining undeveloped hydro power sources on the North American continent. It drains a basin covering an area of 414,000 square miles, stretching from the Rocky Mountains to within 12 miles of Lake Superior. The Nelson rises in the northeast corner of Lake Winnipeg and discharges into Hudson Bay some 410 miles to the northeast. During this journey, Nelson waters drop a total of 712 feet in a series of rapids and falls. The average outflow is 68,000 cubic feet per second and the maximum flow recorded is 136,000 cubic feet per second.

The planned diversion of the Churchill River into the Burntwood and Rat Rivers will result in a reliable flow of 100,000 cubic feet per second. This is about four times the average flow available in the Saskatchewan River. The full generating capacity of Kettle Rapids will be three times that of Grand Rapids and approximately equal to the aggregate of all other

generating facilities at present comprising the system. Through water diversion, and control structures at various locations, the ultimate capacity of the Nelson River system will total an estimated 5,553,000 kilowatts. It is of interest to note that large as it is, Kettle Rapids is second to the yet undeveloped Limestone Rapids as a power producer, the latter having an estimated potential of 1,800,000 kilowatts compared with Kettle's 1,224,000 kilowatts.

Investigation of the Nelson's power potential began as early as 1919. In the late 1940's, surveys were conducted along the river to determine the potential power available. In 1960 the mining development at Thompson created a demand for power which resulted in construction of the Kelsey station, the first in the Nelson River area. Investigations resulting in the present overall concept of Nelson River power development were begun in 1962.

The accompanying map shows the potential hydro electric capacity in the Nelson River area.

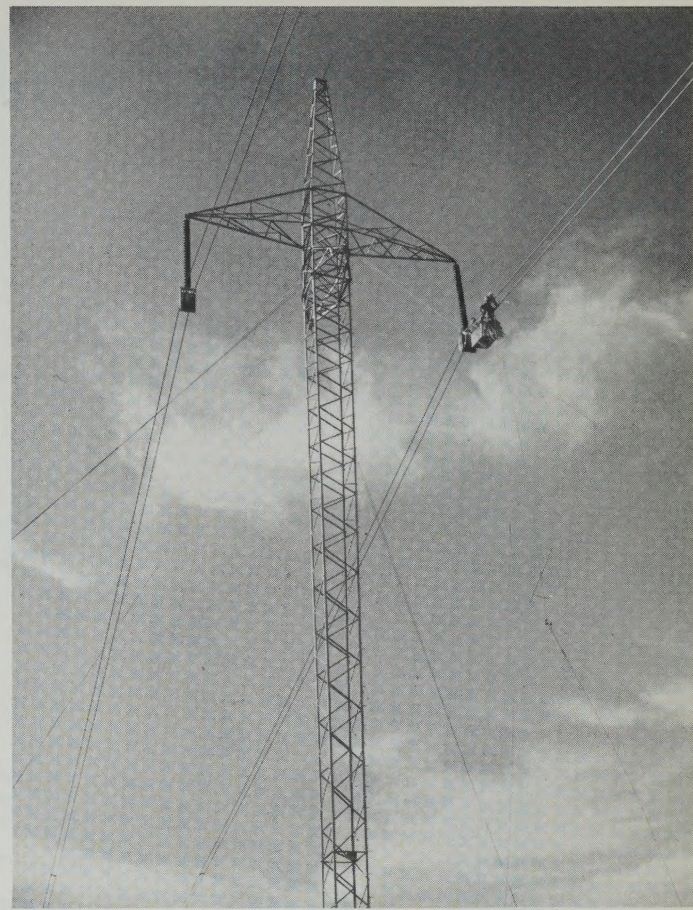
Manitoba Power SOURCES and SUPPLY



900,000 VOLT TRANSMISSION LINE

DIRECT CURRENT

Kettle Rapids to Winnipeg



A car suspended from the cables, is "home" during working hours for some of the personnel at the transmission line test site.

The contrast between the tangent towers to be used on the Nelson River line, and the towers on the line from Grand Rapids (left) is clearly seen in this photograph.

PHOTOS - MANITOBA HYDRO

THE 560-MILE INSTALLATION which will carry power from Kettle Rapids to Winnipeg will be the world's highest DC voltage transmission system when it goes into service in 1971. It is the most recent application of the new long distance, Direct Current, overhead transmission line concept. There is one other under construction in North America running from Oregon to California.

The Nelson River Transmission Line will cost about \$200 million, which includes converter stations at each end of the line. These are required to convert the power from AC to DC and then back again. The two stations represent a substantial part of the total cost of the transmission facilities. Converter equipment alone represents an outlay of \$35 million.

DOMINION BRIDGE, WINNIPEG, GETS \$8 MILLION CONTRACT—The transmission line project is under the authority and direction of Atomic Energy of Canada Limited. A \$4½ million contract has been awarded to DOMINION BRIDGE CO. LTD., WINNIPEG, for the fabrication and supply of approximately 4,000 steel tangent towers. In addition, DOMINION BRIDGE has a \$3½ million contract for the erection of the aforementioned towers plus 300 dead-end towers supplied by a British firm. Canadian Comstock Co. Ltd., Winnipeg, secured a \$6½ million contract to string the conductor and overhead ground wire. This job will entail stringing about 4,500 miles of 1.6 inch diameter overhead conductor cable.

TOWER TEST SITE—On a site at Stonewall, 20 miles north of Winnipeg, engineers are conducting tests to evaluate prototype equipment and to find out how the line will stand up to adverse weather conditions. They are also establishing maintenance techniques compatible with the difficult access conditions at many points along the line. The \$200,000 test facility was designed by AECL'S consultants, Teshmont Consultants Limited of Winnipeg, and is operated by them. It will be in use over the next three years under the present program.

MICROWAVE RADIO RELAY SYSTEM—This is being installed along a route roughly paralleling the transmission line. It will provide telemetering and supervisory control. In addition it will bring network TV to larger communities in the north and provide improved regional telephone communication.

TESHMONT CONSULTANTS LIMITED OF WINNIPEG is a consortium of engineers formed to act as consultants on the Nelson River Transmission Line. In addition to 20 specialists, 50 of the staff are working on design and another 30 are in the field. The group is comprised of personnel from Templeton Engineering Company of Winnipeg, Montreal Engineering Company, and the Shawinigan Engineering Company. The hope has been expressed that the Teshmont organization will remain together indefinitely, and along with researchers from the University of Manitoba, Pioneer Electric, Manitoba Hydro, and Atomic Energy of Canada Limited, establish the nucleus of a High Voltage AC and DC centre in Winnipeg.

*Mr. Industrialist:
Your Western
Headquarters and Plant
Should Be
in Greater Winnipeg*

HERE ARE 4 GOOD REASONS

1. Industrial Centre of the Midwest

INDUSTRIAL EMPLOYMENT – WINNIPEG – 113,788

CALGARY - 66,571 EDMONTON - 73,795 REGINA - 22,952 SASKATOON - 19,516

Source: D.B.S. Catalogue No. 72-002 Industrial Composite, Feb., 1968.

2. Stable Labour Force

HIGHEST-ON-THE-JOB RECORD FOR ORGANIZED LABOUR OF ANY MAJOR EMPLOYMENT REGION IN CANADA.

3. Transportation Centre

- ★ *Focal point of East-West transportation*
- ★ *Complete services by both major railways*
- ★ *Seaport access via Churchill, Manitoba*
- ★ *International Air Terminal*
- ★ *Transcontinental Trucking Centre*
- ★ *Northern Terminus of Rail, Highway and Air Routes to the Midwest U.S.A.*

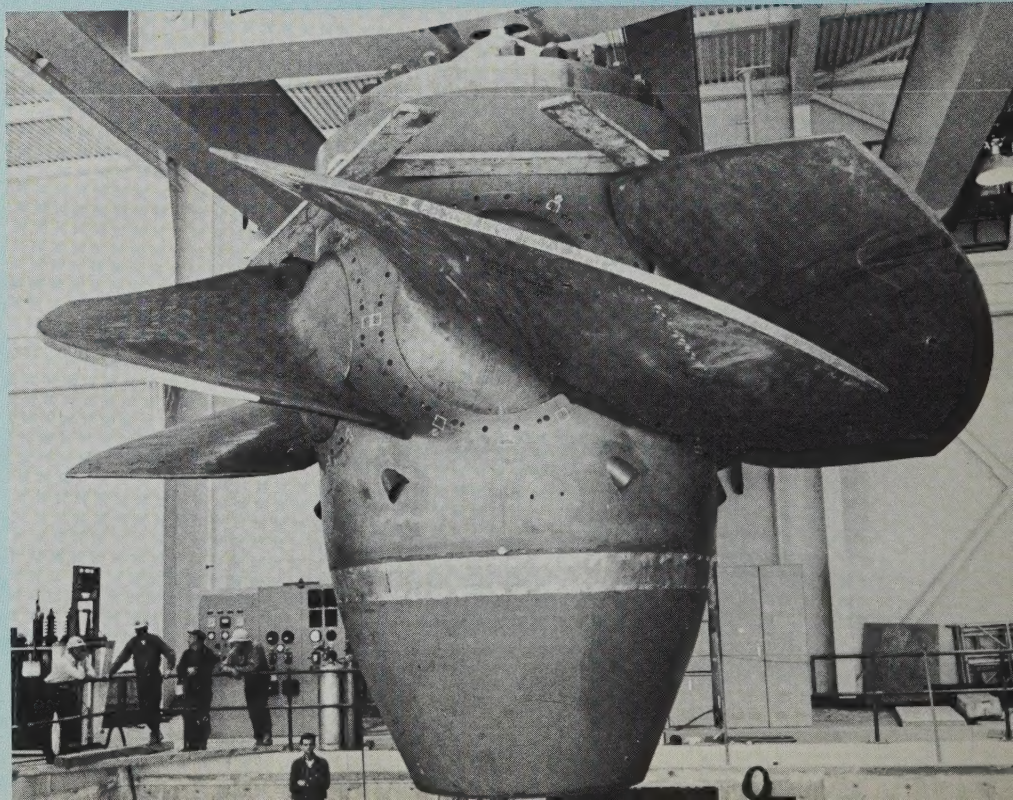
4. Canada's Fourth Largest Metropolis – Population – 520,000

The **Industrial Development Board**
OF GREATER WINNIPEG

the
"Seal of Service"
to Growing Industry



Pioneer Electric from the air.



Water wheel for the fourth and final 110,000 kilowatt unit presently being installed at Manitoba Hydro's Grand Rapids generating station. One of the largest of its kind in the world the propeller was fabricated in Montreal by Canadian Allis-Chalmers.